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ABSTRACT

This report presents the results of various standardized measures administered to Kamehameha Early Education Program (KEEP) students and control students in the school year 1975-1976. In contrast to previous comparisons, KEEP employed more rigorous procedures for the selection of the control students and for the conditions of test administration. These new procedures are described. The kindergarten and first grade KEEP students are superior on measures of math and reading, and, with the possible exception of the Metropolitan Readiness Test, the higher achievement cannot be said to be the result of intelligence differences. The KEEP second and third grade are not significantly different from the control grades on either reading or math measures. These results are essentially what KEEP expected since it was predicted that the effects of the new curriculum would be most evident in kindergarten and first grade. (Author/CTM)

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Abstract

This report presents the results of various standardized measures administered to KEEP students and control students in the school year 1975-1976. In contrast to previous comparisons (see Technical Report #36), KEEP employed more rigorous procedures for the selection of the control students and for the conditions of test administration. These new procedures are described.

Technical Report #69

Standardized Test Results: KEEP and Control Students 1975 - 1976

Ellen Antill Gisela E. Speidel

For purposes of research validity, KEEP has been interested in comparing the achievement of the children attending its demonstration school with that of children in the public schools. In 1973-74 and 1974-75, standardized tests were administered to KEEP students and to public school students of the same age; the results of these administrations were presented in Technical Report #36. This report presents KEEP and comparison data for 1975-76.

Previous comparisons, although favorable to KEEP, were inadequate. First, the public school population was not strictly comparable to that attending KEEP. As is reported in Technical Report #13, KEEP students are randomly selected with the restrictions that 75% be from families receiving financial assistance from the state and that, furthermore, of this group, 67% be part-Hawaiian. No other school in the Kalihi area has as large a concentration of Hawaiians or welfare students. Second, the manner of enrollment of KEEP students added another variable which confounded the comparison. Three-quarters of the KEEP students come from a pool of DSSH recipients who have responded positively to letters from KEEP soliciting the enrollment of their kindergarten-aged child. The selection of KEEP children thus involves a choice on the part of the parents, whereas public school students automatically attend their district school. Third, although the tests were given concurrently, no real attempt had been made to keep conditions of administration equal.

It was particularly important to use more rigorous procedures for the

1975-76 comparison since a new reading curriculum had been installed in the fall of 1975 (see Technical Report #43). Although 25% of the KEEP students are from middle-income families, it was decided to select a control group from the Kalihi public schools only for the DSSH students in each grade then enrolled at KEEP (kindergarten through third grade).

The present report describes the new control selection procedures and conditions of test administration, and compares the performance of the KEEP students to that of their controls.

Control Selection Procedures

The new procedures used to select the control groups were similar to those used to select KEEP students. Namely, the Department of Social Services and Housing (DSSH) compiled lists of the case numbers of all AFDC and General Assistance families living in Kalihi who had children born in 1970 (kindergarten), 1969 (first grade), 1968 (second grade), and 1967 (third grade). Since the list included the case numbers of all families receiving such assistance, it included families whose children attended KEEP. The DSSH then mailed letters inviting families to have their children tested by KEEP to families represented by the case numbers. This procedure was necessary to insure the confidentiality of the information.

Letters were sent to all part-Hawaiian families (N=272) and to 180 non-Hawaiian families. Reply forms were received at KEEP. Twenty percent of the part-Hawaiian familes contacted gave their permission to test and of the non-Hawaiian families, 23% granted permission.

Table 1 shows the total number of acceptances per grade and a breakdown by proportion of part-Hawaiians and non-Hawaiians within each grade level. The control students came from eight Kalihi schools. The total number tested in each grade, however, differs from the numbers given in Table 1.

Table 1

Total Acceptance by Control Grade and Proportionate Acceptance by Ethnicity

	Kindergarten		First Grade		Second Grade		Third Grade		Total	
	N	%	N	%	N	%	N	%	N	%
Total	23	100	33	100	19	100	24	100	99	100
Part-Hawaiian	11	48	21	63	11	58	13	54	56	57
Non-Hawaiian	12	52	12	37	8	42	11	46	43	43

The data in Table 1 include siblings of KEEP students, and it was felt that using their results would confound the comparison. Also, a few students in each grade were absent during the testing days and results could not be obtained.

Although it was hoped that the control groups would be 67% part-Hawaiian, selection was dependent on families' response and relatively more non-Hawaiians gave their consent. Our experience is, however, that the putative non-Hawaiian group of KEEP enrollees always contains a number of actual Hawaiians. It is probable that the control group numbers underestimate the actual percentage of Hawaiians tested.

Standardized Tests

The standardized tests administered to the KEEP students and their controls are summarized in Table 2. With the exception of the Woodcock Reading Mastery Test, an individually administered reading test with five subtests which cover vocabulary and comprehension skills, these tests have been routinely administered at KEEP for three years (see Technical Reports #5, 26, 36, and 40).

Table 2

Standardized Tests Administered to KEEP and Control Students by Grade

	WPPSI	WISC	Metropolitan Readiness Test (MRT)	Gates-MacGinitie Reading Test	Woodcock Reading Mastery	Metropolitan Achievement Test (MAT)--Math Section
K	√		√			√
1		√		√	√	√
2				√		√
3				√		√

The kindergarten and first grade received more tests than the second and third grade for the following reason. It was decided to broaden the comparison in these two groups by administering an additional reading measure and IQ measure to the controls because of the new reading curriculum established that year in first grade and kindergarten (see Technical Report #43). It was felt that the benefits (or deficits) of the new KEEP curriculum would be better reflected with the use of these additional measures.

Administration Procedure

Before testing began, a member of the KEEP staff contacted the public schools in which the control students were enrolled. Arrangements were made with principals or school counselors for a testing room separate from the regular classroom and testing times were scheduled. At schools where there were only a few children to be tested, KEEP requested that students whom teachers wanted assessed be included in testing groups. At this time, rooms for testing also were set aside at KEEP.

Two female psychology graduate students administered the MRT, MAT, and Gates to both KEEP and control students in groups of five to eight. The control students were administered the WPPSI, WISC, and Woodcock by two

females with master's degrees in psychology while KEEP students were administered the WPPSI and WISC by three female graduate students and the Woodcock by a KEEP reading teacher.

At both the public schools and KEEP, testers followed a pre-established testing schedule, with students randomly assigned to groups and groups randomly assigned to days.

Results

The results are presented by grade level and by test. Statistical analyses were conducted on the various measures to compare performance of KEEP students with control students at each grade level. In addition, the mean achievement of part-Hawaiians and non-Hawaiians within each grade is presented.

Kindergarten

IQ

WPPSI. Both KEEP and control kindergarteners are within the average range of IQ, with the mean full scale IQ for KEEP being 101.76 and the mean full scale IQ for the control being 97.36 (see Table 3). There was no statistical difference in full scale IQ. The KEEP students are statistically superior to the control students on verbal IQ, with means of 97 and 88.32, respectively ($t=2.18$, $p < .05$). The control students have a slightly higher performance IQ ($\bar{X}=107.77$) than the KEEP students ($\bar{X}=106.61$) but this difference was not significant.

Reading Readiness

MRT. KEEP students are superior on the MRT total score, with a mean of 57.57 compared to the control students' mean of 48.82 (see Table 3). To determine if the KEEP students perform statistically higher on the MRT with IQ controlled, an analysis of covariance was done, using full scale IQ as the

Table 3

KEEP and Control Kindergarten WPPSI, MRT, and MAT (Math) Results:

Comparison of Total Groups, Hawaiian and Non-Hawaiian

		WPPSI			METRO		MAT MATH	
		TIQ	VIQ	PIQ	Total Raw Score	Total %	S.S.	%
KEEP Total	$\bar{X}$	101.76	97.	106.61	57.57	56.33	31.76	81.
(21)	SD	12.57	15.62	13.13	12.04	22.4	5.55	19.31
Control Total	$\bar{X}$	97.36	88.32	107.77	48.82	41.5	20.77	42.5
(22)	SD	7.73	11.62	8.99	14.63	24.14	6.05	23.1
KEEP Hawaiian	$\bar{X}$	100.12	97.12	103.06	57.31	56.	32.	82.62
(16)	SD	12.19	14.18	12.25	10.84	20.15	4.89	17.98
Control Hawn.	$\bar{X}$	95.8	90.1	103.	53.9	50.3	22.	49.4
(10)	SD	6.18	9.74	7.15	14.78	25.05	5.18	21.21
KEEP Non-Hawn.	$\bar{X}$	107.	96.6	118.	58.4	57.4	31.	75.8
(5)	SD	13.71	21.57	9.35	16.83	31.37	7.96	24.66
Control Non-Hawn.	$\bar{X}$	98.67	86.83	111.75	44.58	34.17	19.75	36.67
(12)	SD	8.87	13.22	8.64	13.66	21.69	6.31	23.73

covariate and the MRT total raw score as the dependent variable. The difference in achievement just missed significance.

Math Achievement

MAT. Table 3 presents the mean standard score and percentile on the MAT math section for the KEEP and control kindergarteners. The KEEP kindergarteners had a mean standard score of 31.76 and a mean percentile rank of 81 while the control students had a mean standard score of 20.77 and a mean percentile rank of 42.46. An analysis of covariance was also performed on these data, with IQ as the covariate and the MAT standard score as the dependent variable; the difference in achievement was significant (F (1, 40)= 37.92, $p < .01$).

First Grade

IQ

WISC. Table 4 summarizes the results of the WISC administration for KEEP and control first grade students. The mean full scale IQs of both groups are virtually identical (KEEP=94.14; control=94.04). KEEP students are slightly higher in verbal IQ, with a mean of 91.71 as compared to the control mean of 87.25, and slightly lower in performance IQ with a mean of 98.10 compared to a control mean of 102.79. These differences were not significant.

Reading Achievement

Gates-MacGinitie. The results of the Gates-MacGinitie Reading Test administration are presented in Table 5. The KEEP students' mean composite score was 41.87 while the control student's mean composite score was 35.79. KEEP first graders performed better on both the vocabulary section (KEEP $\bar{X}$=43.95; control $\bar{X}$=35.67) and the comprehension section (KEEP $\bar{X}$=39.84, control $\bar{X}$=36.48). The difference between the KEEP students and control

Table 4

Control First Versus KEEP First (Total, Hawaiian, Non-Hawaiian):

WISC IQ

	Full Scale		Verbal		Performance	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (21)	94.14	12.79	91.71	12.24	98.10	15.04
Control Total (28)	94.41	12.14	87.25	13.61	102.79	15.36
KEEP Hawn. (17)	92.82	13.64	89.82	11.28	97.59	16.61
Control Hawn. (17)	95.	14.53	89.59	14.74	101.65	15.29
KEEP Non-Hawn. (4)	99.75	6.85	99.75	14.59	100.25	5.38
Control Non-Hawn. (11)	92.55	7.50	83.64	11.35	104.55	15.

Table 5

Control First Versus KEEP First (Total, Hawaiian, Non-Hawaiian):

Gates Standard Scores

	Composite		Vocabulary		Comprehension	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (19)	41.87	9.68	43.95	8.46	39.84	12.05
Control Total (27)	35.79	13.52	35.67	16.25	36.48	12.85
KEEP Hawaiian (15)	42.53	10.71	44.27	9.17	40.87	13.41
Control Hawaiian (16)	32.88	14.53	31.	19.05	34.38	11.19
KEEP Non-Hawn. (4)	39.38	4.15	42.75	5.91	36.	2.71
Control Non-Hawn. (11)	40.96	10.66	42.46	7.53	39.55	14.98

students on the vocabulary section, however, was significant ($t=2.12$, $p<.05$) whereas the difference in comprehension skills was not. An analysis of covariance was performed on the composite Gates score with IQ as the covariate and it was found that there was a significant difference between the two groups (F (1, 43)=6.02, $p<.025$).

Woodcock Reading Mastery. Table 6 presents the mean grade level equivalents and percentile ranks obtained on the Woodcock by KEEP and control students. The KEEP students obtained a grade level equivalent of 1.78 and a percentile rank of 41.81 on the total reading score. The control students obtained a grade level equivalent of 1.60 and a percentile rank of 30.11 on the total reading measure.

The KEEP students were tested at 1.7 or 1.8 (that is, after 7 or 8 months in first grade) while the control students were tested at 1.8 or 1.9. Since grade equivalents are based on time of testing (that is, if a student is tested at 1.7 and achieves a grade equivalent of 1.7, he is reading at the appropriate level for his placement in first grade), the KEEP students' scores and the control students' scores were not directly comparable; thus transformations of the scores had to be done in order to compare the two groups.

The following procedure was used to transform the scores. A difference score was computed for each child by subtracting the time he was tested from the total reading grade equivalent he achieved; this score was the deviation in months from the norm (for example, if a student was tested at 1.7 and achieved a grade equivalent of 1.9, his score would be +2, which means he is achieving 2 months ahead of his actual grade placement). The mean deviation score for KEEP was -.09 with a standard deviation of 5.44 (about 2 days behind the norm) and the mean deviation score for the control group was -2.89 with a standard deviation of 4.05 (about three months behind). An independent

Table 6

Control First Versus KEEP First (Total, Hawaiian, Non-Hawaiian):

Woodcock Reading Mastery Test

		Letter Identification		Word Identification		Word Attack		Word Comprehension		Passage Comprehension		Total Reading	
		GL	%	GL	%	GL	%	GL	%	GL	%	GL	%
KEEP Total (21)	$\bar{X}$	2.12	70.38	1.66	40.29	1.73	28.67	1.69	41.52	1.61	54.19	1.78	41.81
	SD	.34	21.34	.67	28.53	1.48	25.51	.45	25.58	.29	21.42	.55	28.67
Control Total (28)	$\bar{X}$	2.13	60.61	1.46	25.64	1.66	32.14	1.47	22.68	1.43	33.32	1.60	30.11
	SD	.54	25.20	.39	27.31	.51	26.71	.30	23.40	.24	19.43	.43	27.34
KEEP Hawaiian (17)	$\bar{X}$	2.14	70.	1.7	42.65	1.82	29.88	1.73	43.12	1.64	55.04	1.78	44.12
	SD	.37	23.79	.74	29.85	1.64	25.85	.49	27.11	.31	22.20	.60	29.65
Control Hawaiian (17)	$\bar{X}$	1.98	53.18	1.42	22.12	1.59	29.77	1.45	22.65	1.38	30.41	1.54	26.29
	SD	.50	24.35	.37	23.62	.44	24.76	.27	24.09	.22	17.43	.37	21.99
KEEP Non-Hawaiian (4)	$\bar{X}$	2.05	72.	1.5	30.25	1.38	23.5	1.53	34.75	1.5	50.5	1.58	32.
	SD	.10	3.56	.14	22.56	.35	27.04	.21	19.17	.18	20.21	.22	25.11
Control Non-Hawaiian (11)	$\bar{X}$	2.37	72.09	1.52	31.09	1.76	35.82	1.5	22.73	1.51	37.81	1.7	36.
	SD	.55	22.96	.43	32.66	.61	30.36	.35	23.46	.26	22.28	.5	34.38

t-test was computed on the deviation scores and the difference in total reading grade equivalents was found to be significant ($t=2.06$, $p<.05$).

Math Achievement

MAT. The mean standard scores and percentile ranks achieved on the MAT math section by the KEEP and control students are presented in Table 7. The KEEP students obtained a mean standard score of 35.90 and a mean percentile rank of 32.68 while the control students obtained a mean standard score of 32.64 and a mean percentile rank of 23.82. An analysis of covariance was computed on the math scores, with IQ as covariate and percentile rank as the dependent variable. The KEEP students were significantly higher than the control students (F (1, 44)=6.01, $p<.025$).

Second and Third Grade

Reading Achievement

Gates-MacGinitie. The second grade results on the Gates are presented in Table 8 and the third grade results are presented in Table 9. In second grade the control group is slightly higher than the KEEP group on the reading measure (KEEP composite $\bar{X}=34.97$; Control composite $\bar{X}=35.8$).

In third grade the control group obtained a composite mean of 35.92 while the KEEP third grade obtained a composite mean of 29. These differences were not significant in either grade.

Math Achievement

MAT. Mean achievement on the MAT is presented in Table 10 for the second grade and Table 11 for the third grade. In second grade, KEEP students score higher in total math than the control students, with means of 48 and 44.54, respectively. In third grade, KEEP students also are superior to the control students; the former have a mean of 53.8 for total math achievement and the latter have a mean of 47.7. In both grades, none of

Table 7

Control First Versus KEEP First (Total, Hawaiian, Non-Hawaiian):

Metropolitan Achievement Test

	Math S.S.		Math %	
	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (19)	35.90	8.14	32.68	21.15
Control Total (28)	32.64	6.55	23.82	16.24
KEEP Hawaiian (15)	34.	7.53	27.53	19.15
Control Hawaiian (17)	31.29	7.12	20.41	16.25
KEEP Non-Hawaiian (4)	43.	6.93	52.	18.48
Control Non-Hawaiian (11)	34.73	5.08	29.09	15.45

Table 8

Control Second Versus KEEP Second (Total, Hawaiian, Non-Hawaiian):

Gates Standard Scores

	Composite		Vocabulary		Comprehension	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (18)	34.97	18.78	34.33	20.33	35.66	18.32
Control Total (15)	35.8	11.28	35.2	15.66	36.60	11.69
KEEP Hawaiian (13)	34.65	17.73	33.80	19.96	36.	16.94
Control Hawaiian (7)	37.79	9.98	35.86	16.45	39.86	5.27
KEEP Non-Hawn. (5)	35.8	23.5	36.80	23.47	34.8	23.74
Control Non-Hawn. (8)	34.06	12.72	34.63	16.06	33.75	15.15

Table 9

Control Third Versus KEEP Third (Total, Hawaiian, Non-Hawaiian):

Gates Standard Scores

	Composite		Vocabulary		Comprehension	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (10)	29.	18.71	32.4	17.72	24.	22.29
Control Total (17)	25.91	12.06	39.71	12.52	32.35	16.30
KEEP Hawaiian (8)	30.87	17.6	35.12	15.54	26.87	21.98
Control Hawaiian (8)	39.13	11.98	41.88	8.95	36.5	15.85
KEEP Non-Hawaiian (2)	21.5	28.99	21.5	28.99	21.5	28.99
Control Non-Hawn. (9)	33.06	12.08	37.78	15.31	28.67	16.70

Table 10

Control Second Versus KEEP Second (Total, Hawaiian, Non-Hawaiian):

Metropolitan Achievement Test

	Computation		Concepts		Problem Solving		Total	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (18)	51.05	9.65	44.88	13.43	44.94	15.3	48.	12.51
Control Total (15)	47.92	9.62	40.	8.21	41.15	10.51	44.54	8.28
KEEP Hawaiian (13)	49.84	9.77	44.92	13.85	42.76	17.	46.76	13.17
Control Hawaiian (7)	47.43	5.78	37.43	8.8	40.29	11.25	43.	9.27
KEEP Non-Hawn. (5)	54.2	9.60	44.8	13.84	50.6	8.53	51.2	11.3
Control Non-Hawn. (8)	48.5	13.46	43	6.87	42.17	10.53	46.33	8.76

Table 11

Control Third Versus KEEP Third (Total, Hawaiian, Non-Hawaiian):

Metropolitan Achievement Test

	Computation		Concepts		Problem Solving		Total	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
KEEP Total (10)	58.7	14.9	47.3	15.99	51.7	14.1	53.8	15.88
Control Total (20)	49.45	11.45	43.8	12.57	45.85	13.35	47.7	12.94
KEEP Hawaiian (8)	58.27	16.17	48.	16.55	52.5	14.11	54.25	16.79
Control Hawaiian (11)	48.91	12.96	47.27	13.46	47.18	15.3	48.82	14.11
KEEP Non-Hawn. (2)	60.	12.72	44.5	19.09	48.5	19.09	52.	16.97
Control Non-Hawn. (9)	50.11	10.02	39.56	10.57	44.22	11.19	46.33	12.04

the differences are statistically significant.

Summary

The kindergarten and first grade KEEP students are superior on measures of math and reading, and, with the exception of the MRT, the higher achievement cannot be said to be the result of IQ differences. The KEEP second and third grade are not significantly different from the control grades on either reading or math measures. These results are essentially what KEEP expected since it was predicted that the effects of the new curriculum would be most evident in kindergarten and first grade.